CLAIMS

I claim:

1. A method for distinguishing effects due to bifurcation from effects due to design variable changes in finite element analysis, the method comprising:

obtaining a plurality of finite element analysis responses for a set of design experiments, wherein each of the set of design experiments has a specific combination of design variables values;

constructing a metamodel from the plurality of finite element analysis responses; and

selecting a set of outliers from the set of design experiments whose finite element analysis responses are not predicted by the metamodel.

2. The method as recited in claim 1, further comprising:

identifying high likelihood bifurcation region by plotting an indicating quantity of the finite element analysis responses of the set of outliers; and

examining the finite element analysis responses of maximum and minimum of the set of outliers.

3. The method as recited in claim 1, wherein the metamodel is constructed using least squares fitting technique.

4. The method as recited in claim 1, wherein the metamodel is based on nodal displacement.

5. The method as recited in claim 1, wherein the metamodel is based on acceleration history.

6. The method as recited in claim 2, wherein the indicating quantity is chosen from the group consisting of standard deviation and range.

7. A software product to be executable in a computing device for distinguishing effects due to bifurcation from effects due to design variable changes in finite element analysis, the software product comprising:

program code for obtaining a plurality of finite element analysis responses for a set of design experiments, wherein each of the set of design experiments has a specific combination of design variables values;

program code for constructing a metamodel from the plurality of finite element analysis responses; and

program code for selecting a set of outliers from the set of design experiments whose finite element analysis responses are not predicted by the metamodel.

8. The software product as recited in claim 7, further comprising:

program code for identifying high likelihood bifurcation region by plotting an indicating quantity of the finite element analysis responses of the set of outliers; and

program code for examining the finite element analysis responses of maximum and minimum of the set of outliers.

9. The software product as recited in claim 7, wherein the metamodel is constructed using least squares fitting technique.

10. The software product as recited in claim 7, wherein the metamodel is based on nodal displacement.

11. The software product as recited in claim 7, wherein the metamodel is based on acceleration history.

12. The software product as recited in claim 8, wherein the indicating quantity is chosen from the group consisting of standard deviation and range.